Beta Presentation
Augmented Reality Mechanic Training

The Capstone Experience
Team Union Pacific

Justin Barber
Jake Cousineau
Colleen Little
Nicholas MacDonald
Luke Sperling

Department of Computer Science and Engineering
Michigan State University
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Project Overview

• Two immersive training experiences for mechanics

• Learn About Machinery (HoloLens + PC)
  ▪ View labeled holograms of CAD models
  ▪ Select parts to display information
  ▪ Import CAD models through PC application

• Build a Train (Android)
  ▪ Guides user through assembling a 3D printed train
  ▪ Uses object recognition to locate train cars
System Architecture

User

Microsoft HoloLens

Display on HoloLens

Tooltip

Create visual representation

HoloLens Application

Unity

3D Mesh

Push to Unity application

Description

Create 3D mesh and description

Desktop Application

Cadence CAD Model

Import

PiXYZ SOFTWARE

Create 3D mesh and description

Desktop Application
System Architecture

User -> Camera Feed

Camera Feed -> View Train

View Train -> Train Part

Train Part -> View Train

View Train -> Vuforia Scanning Application

Vuforia Scanning Application -> Vuforia Database

Vuforia Database -> Tracking points

Tracking points -> Vuforia Database

Vuforia Database -> Tracking points to database

Tracking points to database -> Move tracking data

Move tracking data -> Unity

Unity -> Give feed to Unity

Give feed to Unity -> Camera Feed

Camera Feed -> Transfer image data

Transfer image data -> AR Phone Application

AR Phone Application -> User
Learn About Machinery: HoloLens Main Menu
Learn About Machinery: Key Part Information

Solenoid Valve
This valve uses the magnetic field from an electric current to control the flow of fluids through the system.
Learn About Machinery: Model Manipulation
Learn About Machinery Portal
Build a Train: Instructions

1. Connect the passenger to the engine
2. Connect the caboose to the passenger
Build a Train: User Error

Error: train car connected backwards

Passenger
Build a Train: Tutorial Complete

Successfully built!
What’s left to do?

• More extensive error handling and optimization of Learn About Machinery networking code
• Distinctive sound/vibration when errors detected in Build a Train
• User interface cleanup
• Final style guide pass on project code
Questions?